

## REMARKS

### *Status of the Claims*

Claims 43-57 and 59-65 are pending in the application. In this Response, new claim 65 has been added. Exemplary support for new claim 65 can be found throughout the specification and claims as originally filed.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

### *Rejections under 35 U.S.C. §§ 102 / 103*

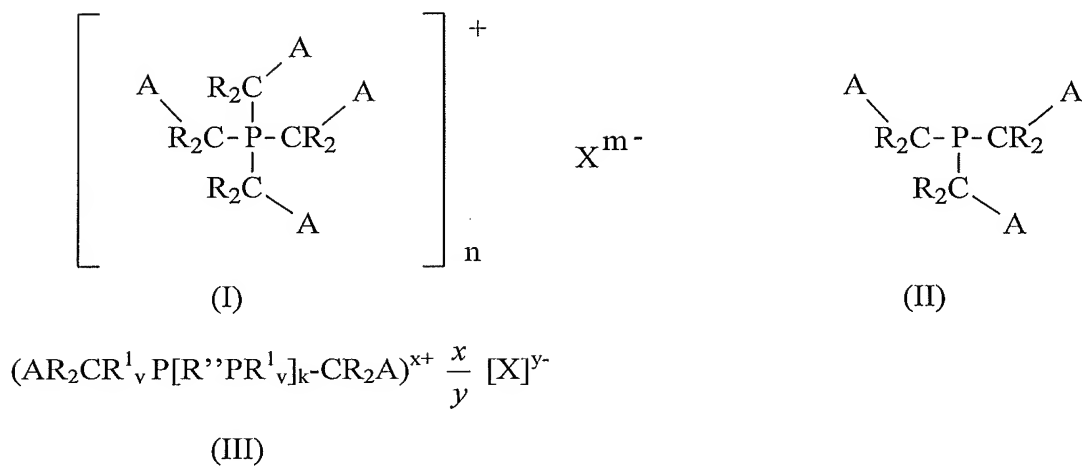
(i) Claims 43-56 and 59-64 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 4,966,716 ("Favstritsky") in view of U.S. Patent No. 5,670,055 ("Yu"). Claim 57 has been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Favstritsky in view of Yu and further in view of U.S. Patent No. 6,784,168 ("Jones"). These rejections are respectfully traversed.

### *Legal Standard*

The Office has the initial burden of establishing a factual basis to support the legal conclusion of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). For rejections under 35 U.S.C. § 103(a) based upon a combination of prior art elements, in *KSR Int'l v. Teleflex Inc.*, 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007), the Supreme Court stated that a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

### *Pending Claims and Present Disclosure*

Independent claim 43 recites a method for controlling the growth of bacterial biomass in an aqueous system comprising adding to, or contacting with, the aqueous system an effective amount of an uncoupling agent which is a water-soluble biocide comprising an alkyl substituted phosphonium compound of formula (I) or an alkyl-substituted phosphine of formula (II) or a condensate of formula (III):



wherein: X is an anion; n is the valency of X represented by m; each A can be the same or different and is selected from OH, OR, SO<sub>3</sub>R, PO<sub>3</sub>R<sub>2</sub>, COOH, COOR, SO<sub>3</sub>H, PO<sub>3</sub>H<sub>2</sub>, CH<sub>2</sub>COOH, substituted alkyl, aryl and substituted amino groups; each R, and each R in each A group, is independently selected from hydrogen, a C<sub>1</sub> to C<sub>20</sub> alkyl, aryl, substituted alkyl or aryl, carboxy or carboxy ester; wherein each CR<sub>2</sub> group may be the same or different, and R'' is a divalent hydrocarbon radical having from 2-20 carbon atoms and is optionally substituted with one or more substituents selected from the group consisting of halogen, hydroxy, carboxy, amino, alkylamino, or PR<sup>1</sup><sub>m</sub>CH<sub>2</sub>OH groups or interrupted by one or more ether or carbonyl linkages; each R<sup>1</sup> is independently a monovalent hydrocarbon radical having from 1 to 25 carbon atoms and optionally substituted with one or more substituents selected from the group consisting of halogen, hydroxy, carboxy, amino, alkylamino, or PR<sup>1</sup><sub>m</sub>CH<sub>2</sub>OH groups or interrupted by one or more ether or carbonyl linkages, and in formula (III) each v is 1 or 2, k is from 0 to 10, x is the number of groups in the molecule having v=2 and X is a compatible anion of valency y such that the compound is water-soluble, wherein the aqueous system is a wastewater treatment plant used for the treatment of industrial or municipal effluent.

Claims 44-57 and 59-64 directly or indirectly depend from claim 43.

The present specification provides that the function of the presently recited uncoupling agents is to disrupt the proton flux. This results in a reduction in bacterial cell division by uncoupling the proton flux thus reducing the energy available to the bacteria. The wasted energy appears as heat. The use of uncoupling agents can often cause increased

nutrient consumption (which is desirable) due to the loss of respiratory control. However, the aforementioned uncoupling agents are usually phenolic compounds, *e.g.*, 2,4-dinitrophenol and para-nitrophenol; halogenated products, *e.g.*, carbonylcyanide-p-trifluoromethoxyphenylhydrazine and 2,4,5-trichlorophenol or nitro compounds. All are unsuitable for use in aqueous systems due to their high environmental toxicity. (See, for example, page 1, lines 27-32 and page 2, lines 1-6 of the present specification).

*Cited Art*

Favstritsky discusses a method for controlling biofouling in an aqueous system comprising the steps of: introducing a water solution comprising (i) an organic ammonium hydrohalide; and (ii) bromine, into the system at a frequency, duration and concentration sufficient to control biofouling in the system. (See claim 1 of Favstritsky). Favstritsky discusses a method for treating biofouling problems inherent in recirculating water systems, by adding a biocidally effective amount of a peculiar water soluble organic ammonium perhalide. (Col. 4, lines 50-63).

The Examiner concedes that the Favstritsky does not disclose or suggest the presently recited uncoupling agent. (Office Action, Page 2). Accordingly, the Examiner cites Yu.

Yu discusses a method for dispersing biofilms caused by the bacteria or other microorganisms on surfaces of an industrial process water system which comprises treating the water with a specific linear alkylbenzene sulfonate possibly combined with tetrakis (hydroxymethyl) phosphonium sulphate. (Col. 2, lines 20-35).

Jones discusses a synergistic biocide which comprises a tris(hydroxymethyl)phosphine or a tetrakis (hydroxymethyl)phosphonium salt and at least one non-surfactant biopenetrant, such as a polymer or copolymer having a plurality of quaternary ammonium groups, a hydrotrope or a syntan, together optionally with a surfactant. (Abstract).

*Differences between Pending Claims and Cited Art*

As discussed hereinabove, the Examiner concedes that the Favstritsky does not disclose or suggest the presently recited uncoupling agent. (Office Action, Page 2).

Accordingly, the Examiner has cited Yu. In this regard, Applicants respectfully submit that the presently recited phosphonium biocides are uncoupling agents. Applicants further respectfully submit that the uncoupling function of the presently recited uncoupling agents is not expressly disclosed in Yu.

Applicants respectfully submit that as provided in the present specification, the function of the presently recited uncoupling agents is to disrupt the proton flux. This results in a reduction in bacterial cell division by uncoupling the proton flux thus reducing the energy available to the bacteria. The wasted energy appears as heat. The use of uncoupling agents can often cause increased nutrient consumption (which is desirable) due to the loss of respiratory control. However, the aforementioned uncoupling agents are usually phenolic compounds, *e.g.*, 2,4-dinitrophenol and para-nitrophenol; halogenated products, *e.g.*, carbonylcyanide-p-trifluoromethoxyphenylhydrazone and 2,4,5-trichlorophenol or nitro compounds. All are unsuitable for use in aqueous systems due to their high environmental toxicity. (See, for example, page 1, lines 27-32 and page 2, lines 1-6 of the present specification).

Applicants respectfully submit that the above-described uncoupling function is not expressly disclosed in Yu. The purpose of Yu is to disperse biofilms caused by the growth of slime-forming bacteria and other microorganisms with a specific linear alkylbenzene sulfonate detergent/dispersant. (Col. 2, lines 21-42). Yu then lists several biocides in Col. 3, lines 13-23. Applicants respectfully submit that Yu does not expressly disclose that the function of Yu's biocides is related to an uncoupling function. Accordingly, Applicants respectfully submit that neither Favstritsky nor Yu expressly disclose the uncoupling function described in the present specification.

With regard to Jones, Applicants respectfully submit that, as cited, Jones fails to cure the above-noted deficiencies of Favstritsky and Yu.

In view of at least the above discussion, Applicants respectfully submit that the obviousness rejections over Favstritsky, Yu, and Jones should be withdrawn.

(ii) Claims 43-57 and 59-64 have been rejected under 35 U.S.C. §§ 102(f)/103(a) because Applicants allegedly did not invent the claimed subject matter. The rejection is respectfully traversed.

Without conceding the propriety of the rejection, Applicants respectfully submit that the following applications were commonly owned at the time of the invention: U.S. Patent Application No. 11/630,604; U.S. Patent Application No. 10/559,969; U.S. Patent Application No. 10/559,970; and U.S. Patent Application No. 11/793,303.

In view of at least the above discussion, Applicants respectfully submit that the rejection should be withdrawn.

***Conclusion***

Applicants invite the Examiner to contact Applicants' representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

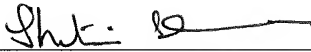
In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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